

THAT WHICH IS CLAIMED:

1. A data acquisition and display device, comprising:

an active beacon detection device to capture orientation and position information about a wearer of the data acquisition and display device; and

5 a see-through display to display information and instructions about one or more items viewed through the see-through display, said information and instructions appearing proximately superimposed on at least one of the one or more items.

2. The data acquisition and display device of claim 1, further comprising:

10 a local computer in communication with the active beacon detection device and see-through display, wherein the local computer computes the orientation and position of the wearer of the data acquisition and display device from the orientation and position information captured by the active beacon detection device, and provides information and instructions to be displayed in the see-through display about at least one of the one or more items in the field of view of the
15 data acquisition and display device.

3. The data acquisition and display device of claim 1, further comprising:

an inertial sensor, wherein the inertial sensor provides orientation information of the data acquisition and display device during movement of the data acquisition and display device.

4. The data acquisition and display device of claim 1, further comprising:

an information gathering device to capture data about the one or more items.

5. The data acquisition and display device of claim 4, further comprising:

25 a local computer in communication with the information gathering device, active beacon detection device, and see-through display, wherein the local computer decodes data from the information gathering device, computes the orientation and position of the wearer of the data acquisition and display device from the orientation and position information captured by the active beacon detection device, and provides information and instructions to be displayed in the
30 see-through display about at least one of the one or more items in the field of view of the data acquisition and display device.

6. The data acquisition and display device of claim 4, wherein the information gathering device is comprised of an image camera.

5 7. The data acquisition and display device of claim 4, wherein the information gathering device comprises an RFID reader.

8. The data acquisition and display device of claim 1, wherein the one or more items are non-singulated.

10

9. The data acquisition and display device of claim 1, wherein the one or more items are singulated.

10. A data acquisition and display device, comprising:

15

an information gathering device to capture data about one or more items;

an active beacon detection device to capture orientation and position information about a wearer of the data acquisition and display device; and

a see-through display to display information and instructions about at least one of the one or more items, said information and instructions appearing proximately superimposed on at least one of the one or more items.

20

11. The data acquisition and display device of claim 10, further comprising:

a local computer in communication with the information gathering device, active beacon detection device, and see-through display, wherein the local computer decodes data from the information gathering device, computes the orientation and position of the wearer of the data acquisition and display device from the orientation and position information captured by the active beacon detection device, and provides information and instructions to be displayed in the see-through display about at least one of the items in the field of view of the data acquisition and display device.

25
30

12. The data acquisition and display device of claim 10, further comprising:
an inertial sensor, wherein the inertial sensor provides orientation information of the data acquisition and display device during movement of the data acquisition and display device.

5 13. The data acquisition and display device of claim 10, wherein the information gathering device is comprised of an image camera.

14. The data acquisition and display device of claim 10, wherein the information gathering device is comprised of an RFID reader.

10

15. A data acquisition and display device, comprising:
an image camera to capture image data about one or more items;
an active beacon detection device to capture orientation and position information about a wearer of the data acquisition and display device;

15 a see-through display to display information and instructions about at least one of the one or more items, said information and instructions appearing proximately superimposed on the item;

an inertial sensor, wherein the inertial sensor provides orientation information of the data acquisition and display device during movement of the data acquisition and display device; and

20 a local computer in communication with the image camera, active beacon detection device, see-through display, and inertial sensor, wherein the local computer decodes image data from the image camera, computes the orientation and position of the wearer of the data acquisition and display device from the orientation and position information captured by the active beacon detection device and the inertial sensor, and provides information and instructions
25 to be displayed in the see-through display about at least one of the items in the field of view of the data acquisition and display device.

16. The data acquisition and display device of claim 15, wherein the data acquisition and display device is used for the sorting and processing of mail and parcels.

30

17. The data acquisition and display device of claim 15, further comprising:

a tracking system, the tracking is further comprised of:

a source of energy;

a passive beacon proximately located on the one or more items, said passive
5 beacon reactive to the source of energy;

two or more fixed detectors capable of detecting energy transmitted or reflected
from the passive beacon; and

a passive beacon location tracking computer in communication with the two or
more fixed detectors, wherein the passive beacon location tracking computer knows the
10 location of each fixed detector relative to the other fixed detectors and the passive beacon
location tracking computer is able to compute the location of the passive beacon from the
energy received by the two or more fixed detectors from the passive beacon as the
location of the item changes, wherein information about an item's location is provided to
the local computer from the tracking system so that the local computer can determine
15 what items are in the data acquisition and display device's field of view and information
about at least one of those items can be displayed in the see-through display such that the
instructions and information appear proximately superimposed on the item.

18. The data acquisition and display device of claim 17, wherein the passive beacon is
20 comprised of retro-reflective material.

19. The data acquisition and display device of claim 18, wherein the source of energy is
comprised of a light.

20. The data acquisition and display device of claim 17, wherein the two or more fixed
25 detectors are comprised of two or more fixed cameras.

21. The data acquisition and display device of claim 17, wherein the one or more items are
non-singulated.

22. The data acquisition and display device of claim 17, wherein the one or more items are singulated.

23. A tracking system, comprising:

5 a source of energy;

one or more passive beacons proximately located on one or more items, said passive beacons reactive to the source of energy;

two or more fixed detectors that are each capable of detecting energy transmitted or reflected from the passive beacon; and

10 a passive beacon location tracking computer in communication with the two or more fixed detectors, wherein the passive beacon location tracking computer knows the location of each fixed detector relative to the other fixed detectors and the passive beacon location tracking computer is able to compute the location of the passive beacon from the energy received by the two or more fixed detectors from the passive beacon as the location of the item changes.

15 24. The tracking system of claim 23, wherein the tracking system is used for the tracking of mail and parcels.

20 25. The tracking system of claim 23, wherein the two or more fixed detectors are comprised of two or more fixed cameras.

26. The tracking system of claim 23, wherein the one or more items are non-singulated.

25 27. The tracking system of claim 23, wherein the one or more items are singulated.

28. The tracking system of claim 23, further comprising:
a data acquisition and display device, the data acquisition and display device further
comprised of:

an information gathering device to capture data about the one or more items;

an active beacon detection device to capture orientation and position information
about a wearer of the data acquisition and display device;

a see-through display to display information and instructions about at least one of
the one or more items, said information and instructions appearing proximately
superimposed on the one or more items; and

a local computer in communication with the information gathering device, active
beacon detection device, and see-through display, wherein the local computer decodes
data from the information gathering device, computes the orientation and position of the
wearer of the data acquisition and display device from the orientation and position
information captured by the active beacon detection device, and provides information and
instructions to be displayed in the see-through display about items in the field of view of
the data acquisition and display device, wherein information about an item's location is
provided to the local computer from the tracking system so that the local computer can
determine what items are in the data acquisition and display device's field of view and
information about those items can be displayed in the see-through display such that the
instructions and information appear proximately superimposed on the one or more items.

29. The tracking system of claim 28, wherein the information gathering device is comprised
of an image camera.

30. The tracking system of claim 28, wherein the information gathering device is comprised
of an RFID reader.

31. The tracking system of claim 28, wherein the passive beacon is comprised of retro-
reflective material.

32. The tracking system of claim 31, wherein the source of energy is comprised of a light.

33. The tracking system of claim 28, wherein the passive beacon is comprised of an RFID tag.

5 34. An item processing system, comprising:

a data acquisition and display device, the data acquisition and display device further comprised of:

an information gathering device to capture data about one or more item;

10 an active beacon detection device to capture orientation and position information about a wearer of the data acquisition and display device;

a see-through display to display information and instructions about the one or more items, said information and instructions appearing proximately superimposed on the item; and

15 a local computer in communication with the information gathering device, active beacon detection device, and see-through display, wherein the local computer decodes data from the information gathering device, computes the orientation and position of the wearer of the data acquisition and display device from the orientation and position information captured by the active beacon detection device, and provides information and instructions to be displayed in the see-through display about one or more items in the field of view of the data acquisition and display device; and

20 a tracking system, the tracking system further comprised of:

a source of energy;

a passive beacon proximately located on the item, said passive beacon is reactive to the source of energy;

25 two or more fixed detectors each capable of detecting energy transmitted or reflected from the passive beacon; and

30 a passive beacon location tracking computer in communication with the two or more fixed detectors, wherein the passive beacon location tracking computer knows the location of each fixed detector relative to the other fixed detectors and the passive beacon location tracking computer is able to compute the location of the passive beacon from the

energy received by the two or more fixed detectors from the passive beacon as the location of the one or more items change; and

two or more unique active beacons having known locations that provide orientation and position signals to the active beacon detection device, wherein information about one or more items' location is provided to the local computer from the tracking system so that the local computer can determine what items are in the data acquisition and display device's field of view and information about those items can be displayed in the see-through display such that the instructions and information appear proximately superimposed on the one or more items.

35. The item processing system of claim 34, wherein the data acquisition and display device further comprises:

an inertial sensor, wherein the inertial sensor provides orientation information of the data acquisition and display device during movement of the data acquisition and display device.

36. The item processing system of claim 34, wherein the information gathering device is comprised of an image camera.

37. The item processing system of claim 34, wherein the information gathering device is comprised of an RFID reader.

38. The item processing system of claim 34, wherein the passive beacon is comprised of retro-reflective material.

39. The item processing system of claim 38, wherein the source of energy is comprised of a light.

40. The item processing system of claim 34, wherein the passive beacon is comprised of an RFID tag.

41. The item processing system of claim 34, wherein the two or more active beacons are comprised of sources of blinking light.

42. The item processing system of claim 34, wherein the item tracking system is used for the sorting and processing of mail and parcels.

5 43. The item processing system of claim 34, wherein the one or more items are non-singulated.

44. The item processing system of claim 34, wherein the one or more items are singulated.

10 45. A method of processing an item, comprising:
viewing one or more items while wearing a data acquisition and display device having a see-through display;
displaying processing instructions on the see-through display, wherein said processing instructions appear proximately superimposed on the one or more items; and
15 processing the one or more items in accordance with the processing instructions.

46. The method of claim 45, wherein said method is used for the processing of mail and parcels.

20 47. The method of claim 45, further comprising:
tracking the one or more items with a tracking system as the one or more items' locations change;
determining the orientation and position of a wearer of the data acquisition and display device;
25 determining which of the one or more items are in the field of view of the data acquisition and display device; and
displaying processing instructions on the see-through display of at least one of the one or more items within the field of view of the data acquisition and display device.

30 48. The method of claim 47, wherein said method is used for the processing of mail and parcels.

49. A method of processing an item, comprising:

tracking one or more items with a tracking system as the one or more items' locations changes;

determining the orientation and position of a wearer of a data acquisition and display device having a see-through display;

determining which of the one or more items are in the field of view of the see-through display of the data acquisition and display device;

viewing at least one of the one or more items through the see-through display of the data acquisition and display device;

displaying processing instructions relevant to at least one of the one or more items on the see-through display, wherein said processing instructions appear proximately superimposed on the one or more items; and

processing the one or more items in accordance with the processing instructions.

50. The method of claim 49, wherein said method is used for the processing of mail and parcels.

51. A method of displaying information about one or more items in a see-through display of a data acquisition and display device, comprising:

capturing orientation and position information about a wearer of the data acquisition and display device;

determining a field of view of the see-through display from the captured orientation and position information; and

displaying information on the see-through display about the one or more items in the field of view of the see-through display such that said information appears proximately superimposed on the one or more items when the one or more items are viewed through the see-through display.

52. The method of claim 51, wherein said method is used for displaying information about mail and parcels in the see-through display of the data acquisition and display device.

53. The method of claim 51, further comprising:
capturing data about the one or more items;
determining information and instructions about the one or more items from the captured
5 data; and
determining a field of view of the see-through display from the captured orientation and
position information.

54. A method of displaying information in a see-through display of a data acquisition and
10 display device, comprising:
capturing data about one or more items;
determining information and instructions about the one or more items from the captured
data;
capturing orientation and position information about a wearer of the data acquisition and
15 display device;
determining a field of view of the see-through display from the captured orientation and
position information; and
displaying information and instructions on the see-through display about at least one of
the one or more items in the field of view of see-through display such that said information and
20 instructions appear proximately superimposed on the one or more items when the one or more
items are viewed through the see-through display.

55. The method of claim 54, wherein said method is used for displaying information about
mail and parcels in the see-through display of the data acquisition and display device.

25

56. A method of tracking one or more items, comprising:
providing a source of energy;
locating a passive beacon proximately on an item, said passive beacon is reactive to the source of energy;

5 providing two or more fixed detectors having known fixed locations relative to one another, each fixed detector capable of detecting energy transmitted or reflected from the passive beacon; and

computing the location of the passive beacon from the energy received by the two or more fixed detectors from the passive beacon as the location of the one or more items changes.

10

57. The method of claim 56, wherein said method is used for the tracking of mail and parcels.

58. The method of claim 56, further comprising:

providing a data acquisition and display device having a see-through display, an information gathering device, a local computer, and a beacon detection device;

15

capturing data about the one or more items with the information gathering device;

determining information and instructions about the one or more items from the captured data with the local computer;

capturing orientation and position information about a wearer of the data acquisition and display device with the beacon detection device;

20

determining a field of view of the see-through display from the captured orientation and position information;

determining if at least one of the one or more items are in the field of view of the see-through display from the location of the passive beacon; and

25 displaying information and instructions on the see-through display about at least one of the one or more items if the one or more items are in the field of view of see-through display such that said information and instructions appear proximately superimposed on the one or more items when the one or more items are viewed through the see-through display.

59. A method of tracking one or more items, comprising:

providing a source of energy;

locating a passive beacon proximately on the one or more items, said passive beacon reactive to the source of energy;

providing two or more fixed detectors having known fixed locations relative to one another, each fixed detector capable of detecting energy transmitted or reflected from the passive beacon;

computing the location of the passive beacon from the energy received by the two or more fixed detectors from the passive beacon as the location of the one or more items changes;

providing a data acquisition and display device having a see-through display, an information gathering device, a local computer, and a beacon detection device;

capturing data about the one or more items with the information gathering device;

determining information about the one or more items from the captured data with the local computer;

capturing orientation and position information about the data acquisition and display device with the beacon detection device;

determining a field of view of the see-through display from the captured orientation and position information;

determining if at least one of the one or more items are in the field of view of the see-through display from the location of the passive beacon; and

displaying information and instructions on the see-through display about at least one of the one or more items if the one or more items are in the field of view of see-through display such that said information and instructions appear proximately superimposed on the one or more items when the one or more items are viewed through the see-through display.

60. The method of claim 59, wherein said method is used for the tracking of mail and parcels.

61. The method of claim 59, wherein capturing data about the one or more items with the information gathering device is performed with an image camera.

62. The method of claim 59, wherein capturing data about the one or more items with the information gathering device is performed with an RFID reader.

63. A method of tracking items, comprising:

5 providing a data acquisition and display device having an information gathering device to capture data about an item, an active beacon detection device to capture orientation and position information about a wearer of the data acquisition and display device, a see-through display to display information and instructions about the item, and a local computer in communication with the information gathering device, active beacon detection device, and see-through display, wherein the local computer decodes data from the information gathering device, computes the orientation and position of the wearer of the data acquisition and display device from the orientation and position information captured by the active beacon detection device, and provides information and instructions to be displayed in the see-through display about at least one of the items in the field of view of the data acquisition and display device; and

15 providing a tracking system having a source of energy, a passive beacon located on the item that is reactive to the source of energy, two or more fixed detectors that are each capable of detecting energy transmitted or reflected from the passive beacon, and a passive beacon location tracking computer in communication with the two or more fixed detectors, wherein the passive beacon location tracking computer knows the location of each fixed detector relative to the other fixed detectors and the passive beacon location tracking computer is able to compute the location of the passive beacon from the energy received by the two or more fixed detectors from the passive beacon as the locations of the items change;

25 providing information about the one or more items' location to the local computer from the tracking system so that the local computer can determine what items are in the data acquisition and display device's field of view;

displaying information about at least one of the items in the field of view of the data acquisition and display device in the see-through display such that the instructions and information appear proximately superimposed on the item.

64. A method of computing the orientation and position of a wearer of a data acquisition and display device, comprising:

providing two or more unique active beacons having known locations relative to one another;

5 providing a data acquisition and display device having a beacon detection device with a defined field of view;

sensing two or more unique active beacons within the beacon detection device's field of view; and

10 determining the location of the data acquisition and display device relative to the known location of the two or more unique active beacons within the field of view of the beacon detection device.

65. The method of claim 64, further comprising:

15 providing an inertial sensor on the data acquisition and display device, wherein the inertial sensor provides orientation information of the data acquisition and display device during movement of the data acquisition and display device.

66. A method of calibrating a fixed camera of an optical tracking system, comprising:

A) placing the optical tracking system in calibration mode for the selected uncalibrated fixed camera;

B) placing a reflective passive beacon within the field of view of two or more fixed cameras, at least one of which is the selected uncalibrated fixed camera;

C) providing an energy source that will reflect from the reflective passive beacon and can be detected by the two or more fixed cameras;

D) covering and uncovering the reflective passive beacon thus causing the reflective passive beacon to “wink” at the two or more fixed cameras, one of which is the selected uncalibrated fixed camera;

E) computing the possible locations of the two or more fixed cameras, one of which is the selected uncalibrated fixed camera, relative to one another;

E) repositioning the reflective passive beacon within the field of view of the two or more fixed cameras, one of which is the selected uncalibrated fixed camera; and

F) repeating steps D through E until a location for each uncalibrated fixed camera of the two or more fixed cameras is determined.

67. The method of claim 66, wherein placing a reflective passive beacon within the field of view of two or more fixed cameras is performed by placing a reflective passive beacon comprised of a retro-reflective material within the field of view of two or more fixed cameras.

68. The method of claim 66, wherein providing an energy source that will reflect from the reflective passive beacon and can be detected by the two or more fixed cameras is performed by providing an energy source comprised of a light.

69. A system for processing items, comprising:

a tracking system, configured to provide location information for each of a plurality of items on a surface; and

a display device for viewing characteristic information for each of the plurality of items at their respective locations.

70. The system of claim 69, wherein the characteristic information for each of the plurality of items is positioned to indicate the relative position of the plurality of items on the surface.

71. The system of claim 70, wherein the characteristic information comprises a zip code.

72. The system of claim 69, further comprising representations of the plurality of items that are viewed by the display device, wherein each representation is positioned relative to the plurality of items on the surface and the characteristic information about the plurality items is positioned proximate to the representation.

73. The system of claim 72, wherein each representation of the plurality of items is comprised of characteristic information about that respective item.

74. The system of claim 73, wherein the characteristic information comprises a zip code.

75. The system of claim 69, wherein the display device is a see-through display device and the characteristic information appears to be proximately superimposed on at least one of the plurality of items viewed through the display device.

76. The system of claim 69, wherein the display device is a display monitor.

77. The system of claim 69, wherein the plurality of items are comprised of parcels.

78. The system of claim 69, wherein the surface is comprised of a moving surface.

79. The system of claim 69, wherein the plurality of items are comprised of moving items.

80. The system of claim 69, wherein the characteristic information is comprised of instructions for sorting the plurality items.

81. The system of claim 69, wherein the tracking system is comprised of an optical tracking system.

82. The system of claim 69, wherein the plurality of items are non-singulated.

5

83. The system of claim 69, wherein the plurality of items are singulated.